08/456,227

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/456,229	05/31/95	HARRISON	RD-22,530

EXAMINER	
NGUYEN, T	
ART UNIT	**PAPER NUMBER**
2304	4

B3M1/0905

GENERAL ELECTRIC COMPANY
CRD PATENT DOCKET RM 4A59
PO BOX 8 BLDG K 1 SALAMONE
SCHENECTADY NY 12301

DATE MAILED: 09/05/96

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined ☐ Responsive to communication filed on _____ ☐ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), 0 days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☒ Notice of References Cited by Examiner, PTO-892.
2. ☒ Notice of Draftsman's Patent Drawing Review, PTO-948.
3. ☒ Notice of Art Cited by Applicant, PTO-1449. (2 sheets)
4. ☐ Notice of Informal Patent Application, PTO-152.
5. ☐ Information on How to Effect Drawing Changes, PTO-1474.
6. ☐ _____.

Part II SUMMARY OF ACTION

1. ☒ Claims 1-19 are pending in the application.

   Of the above, claims _____ are withdrawn from consideration.

2. ☐ Claims _____ have been cancelled.
3. ☐ Claims _____ are allowed.
4. ☐ Claims 1-8, 11-19 are rejected.
5. ☒ Claims 9 and 10 are objected to.
6. ☐ Claims _____ are subject to restriction or election requirement.
7. ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawings are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____. has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).
11. ☐ The proposed drawing correction, filed _____, has been ☐ approved; ☐ disapproved (see explanation).
12. ☐ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. _____ ; filed on _____.
13. ☐ Since this application apppears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.
14. ☐ Other

EXAMINER'S ACTION

PTOL-326 (Rev. 2/93)

Part III DETAILED ACTION

Notice to Applicant(s)

1. This application has been examined. Claims 1-19 are pending.

2. The prior art submitted on May 31, 1995 has been considered.

3. The drawings are approved by the draftsman and examiner.

Specification

4. The disclosure is objected to because of the following informalities:

On page 10, line 26, the term "cpAnother" should be --Another--.

On page 13, line 6, the term "whence" should be --where--. Furthermore, on line 18, the symbol $r_i(t)$ should be corrected in order to match with the one in figure 3. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. § 102(b) as being anticipated by Brown et al. (5,225,842).

Brown et al. disclose the invention as claimed (see at least the abstract) which includes the steps of measuring data related to propagation time differences between signals transmitted from a plurality of satellites and received at the object to be tracked (see column 2, lines 26-31, column 4, lines 3-8), transmitting the measured data to a central station (see figure 1; column 4, lines 9-12), and calculating at the central station the location of the object based on the transmitted measured data (see column 4, lines 12-14) and data derived from at least one receiver apart from the object (see at least claim 28).

Therefore, all of the limitations of claim 1 is met by Brown et al.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the

> differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 2, 3, 6, and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. (5,225,842) as applied to claim 1 above, in view of Barnard (5,119,102).

9.1. With respect to claims 2, Brown et al. disclose the claimed invention as discussed above. Brown disclose that the raw satellite measurements, with relevant timing and status information, is transmitted to the central station and is used to determined the location of the object to be tracked (see column 4, lines 9-14). Brown et al. do not explicitly disclose that the

data transmitted to the central station includes satellite identification data. However, Barnard suggests a vehicle location system which includes in the transmitting of data, from the object to be tracked, an identifying signal with the recorded satellite signals so that the central station has a knowledge of the origin of any particular signal (see column 3, lines 54-57). The suggestion of the Barnard patent in column 3 would have motivated one of ordinary skill in the art to incorporate the step of transmitting the satellite identification data as taught by Barnard as status information in the system of Brown et al. because such modification would provide more information to the central station about which satellites are being used for tracking the object along with the propagation time differences, thereby increasing the accuracy in determining the location of the tracked object.

Thus, because of the motivation set forth above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Barnard and Brown et al.

9.2. Claim 12 is an apparatus claim corresponding to method claims 1 and 2. Therefore, claim 12 is rejected for the same rationales set forth for claims 1 and 2.

9.3. With respect to claim 3, Brown et al. disclose, as admitted in the prior art, that the plurality of satellites comprises at least four GPS satellites to compute a three

dimensional position and velocity fix(see column 2, lines 33-37), and that the data related to propagation time differences comprises code word phase measurements simultaneously derived from the signals transmitted from the plurality of satellites and received at the object (see at least column 5, lines 29-64 and claims 9 and 11).

9.4. With respect to claim 6, Brown et al. also disclose that the data comprises receiver code-time offsets and code periods (see column 2, lines 26-37 and column 5, lines 29-64).

9.5. With respect to claim 11, Brown et al. further disclose that one to eight channels can be configured (see column 5, lines 53-64). Brown et al. do not explicitly disclose the step of transmitting time signals to the object over a separate channel. However, Barnard suggests that the signals be transmitted on a different channel (see column 3, lines 20-26). The suggestion of Barnard would have motivated one of ordinary skill in the art to incorporate the step of transmitting signal using a separate channel into the system of Brown et al. This combination would certainly increase the accuracy of the signal transmission/reception.

9.6. With respect to claim 13, Brown et al. disclose that the object to be tracked includes a receiver means located within the object for receiving signals from the satellites (see figure 1, item 10; and column 8, lines 48-52), first processor

means for processing data from the receiver means related to propagation time differences (see figure 2, item 24; and column 4, lines 3-6), and transmission means for transmitting the processed data to the central station (see figure 1, items 30-31; and column 8, lines 40-43.). Brown et al. also disclose that the system includes a second processor means located at the central station for determining the location of the object (see column 8, lines 20-39).

9.7. With respect to claims 14 and 15, Brown et al. do not explicitly disclose that first processor means comprises means for processing the data at predetermined time intervals or at time intervals in synchronism with the receiver signal events. However, Barnard suggests that processing of the signal can be either at predetermined intervals or synchronous with the receipt of the signal (see column 3, lines 32-40). One of ordinary skill in the art would have been motivated to combine the teaching of Barnard into the system of Brown et al. because the transition time of the satellite signal must be known as accurately as possible in order to make a position fix.

10. Claims 4, 7, 8, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. and Barnard as applied to claims 2, 3, 6, 11-15 above, and further in view of Janc et al. (4,785,463).

10.1. With respect to claim 4, Brown et al. and Barnard disclose the claimed invention as discussed above, but do not explicitly indicate that the data related to propagation time differences comprises bit phase measurements simultaneously derived from the signals transmitted from the plurality of satellites and received at the object. However, as discussed by Janc et al. (see background of the invention), it is known in the art that the data related to the propagation time differences comprises bit phase measurement. (see column 2, lines 18-55). As indicated by Janc et al., all known GPS receivers accomplish the measurement of bit timing, as well as other common functions, by utilizing standard technology. It would have been obvious to one of ordinary skill in the art to incorporate the disclosure of Janc et al. into the system of Brown et al. to ensure that the receiver for this system can perform the same necessary functions as known in the art.

10.2. With respect to claim 7, Brown et al. do not disclose the step of recording the time at which the data are derived and transmitting such information to the central station. However, Barnard suggests that the system includes the steps of recording and transmitting a time of arrival (TOA) signal with the satellite data to the central station which are used to the determine the location of the object to be tracked (see column 3, lines 47-50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to

incorporate the teaching of Barnard in column 3 into the system of Brown et al. because such combination would increase the accuracy of the determination of the location of the object by taking the satellite signals arrival time into account (see column 36-46).

10.3. With respect to claim 8, Barnard also suggests the steps of measuring, at the object to be tracked, delay between the time at which the data are recorded and the time when the data are transmitted to the central station and transmitting the measured delay to the central station (see column 3, lines 33-57). It would have been obvious to one of ordinary skill in the art to incorporate the teaching of Barnard in column 3 into the system of the Brown et al. because such combination would provide more information to the central station about the delay between the time at which the data are recorded and the time when the data are transmitted, thereby improving the accuracy of the determination of the location of the tracked object.

10.4. With respect to claims 18 and 19, as discussed previously, Brown et al. disclose a system which comprises a receiver means at the tracked object, a first processor means, a transmission means for transmitting the measurements to the central station, and a second processor means at the central location for determining the signal propagation times and the location of the tracked object (see at least claim 1). Brown et al. do not explicitly disclose that the first processor means

calculates the receiver bit phase, the bit-time offset,and the bit period for the satellite signals. However, as discussed by Janc et al., receiver bit timing calculations is a common step during signal acquisition of GPS receivers (see background of the invention). Data bit timing derivation, as known in the art, include the bit phase measurement as well as the offset and period calculation. It would have been obvious to one of ordinary skill in the art to ensure that the system as taught by Brown et al. could accomplish the functions of GPS receiver as indicated by Janc et al. because those functions must be performed in order for the signal to be acquired and processed accurately.

11. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. and Barnard as applied to claims 2, 3, 6, and 11-15 above, and further in view of Inamiya (5,160,935).

11.1. With respect to claim 16, Brown et al. and Barnard disclose the claimed invention as discussed above except for the received signal events from the satellites includes a telemetry-word preamble signal event in GPS signal. However, Inamiya suggests a method for positioning an observation point which includes that each signal transmitted from the satellite includes a telemetry signal 203 which is used in the calculation of the signal propagation delay (see figure 18 and column 15, lines 52

to column 16, lines 38). The suggestion of the Inamiya patent in columns 15 and 16 would have motivated one of ordinary skill in the art to combine the teaching of Inamiya with the system of Brown et al. and Barnard because such telemetry signal in GPS signal would provide more information about that signal and would be used in the calculation of the propagation time delay.

Thus, because of the motivation set forth above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Inamiya, Barnard and Brown et al.

11.2. With respect to claim 17, the limitation of this claim has been noted in the rejection above. It is therefore considered rejected as set forth above.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. as applied to claim 1 above, in view of Effland et al. (5,008,679).

Brown et al. disclose that claimed invention as discussed above. Brown et al. do not explicitly disclose a system wherein the step of calculating the location of the tracked object comprises calculating a point of intersection of curves defined by said propagation time differences. However, Effland et al. disclose a method for locating an unknown transmitter which includes the determination of intersection of curves defined by the difference in propagation times of the signals (see at least

the background of the invention and claim 10). One of ordinary skill in the art, at the time the invention was made, would have been motivated to incorporate the technique taught by Effland et al. into the system of Brown et al. because such technique serves to enhance the accuracy of locating the tracked object.

Thus, because of the motivation set forth above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Effland et al. and Brown et al.

11. Claims 9 and 10 are objected to as being dependent upon the rejected base claims, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11.1 After carefully reviewing the application in light of the prior art of record and the search of all the possible areas relevant to the present application, a set of related prior art have been found, but those prior art references are not deemed strong to make the application unpatentable.

11.2. Although the prior art disclose several claimed limitations, none of the references teach a method of identifying location of an objected to be tracked which includes the steps of "assuming a feasible value ... to reach the central station", "calculating the location of said object ... the assumed value of said communication", "calculating a new value ... the calculated

location of said object to be tracked", and "calculating a corrected location ... the calculation new value for said communication time delay" as cited in claim 9.

Conclusion

13. The following references are cited as being of general interest: Hiraiwa (4,897,661), Greenspun et al. (5,150,310), Kyrtsos (5,430,657), and Hori et al. (4,689,626).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tan Nguyen, whose telephone number is (703) 305-9755. The examiner can normally be reached on Monday-Thursday from 7:30 AM-5:00 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J. Teska, can be reached on (703) 305-9704. The fax phone number for this Group is (703) 308-5357.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3800.

Tan Nguyen

TAN Q. NGUYEN
PATENT EXAMINER
GROUP 230[illegible]

September 02, 1996